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TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

TEST AND REPAIR SYSTEM, ELECTRONIC EQUIPMENT AN/MSM-105 (V) 1

HEADQUARTERS, DEPARTMENT OF THE ARMY
2 AUGUST 1982

A910045774

WARNING

HIGH VOLTAGE is used in the operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know the areas in this equipment containing high voltage. Be careful not to come in contact with the high voltage connections during operation of this equipment.

Do not be misled by the term "Low Voltage." Potentials as low as 25 volts may cause death under adverse conditions.

WARNING

FLAMMABLE SOLVENTS are used in the maintenance of this equipment. Adequate ventilation should be provided while using isopropyl alcohol. Prolonged breathing of the vapor should be avoided. The solvent is not to be used near heat, sparks, or open flames; it is highly flammable. Since isopropyl alcohol dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which are solvent-resistant. If the solvent is taken internally, consult a physician immediately.

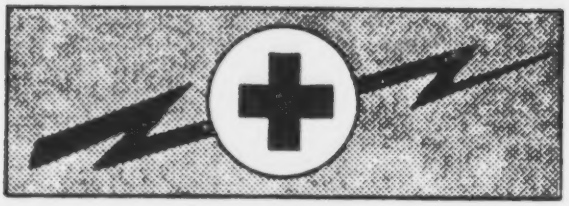
WARNING

COMPRESSED AIR is used in the maintenance of this equipment. When used for cleaning, the compressed air source must limit nozzle pressure to no more than 29 pounds per square inch (PSIG). Goggles must be worn when cleaning with compressed air.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

WARNING



HIGH VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Be careful not to contact high-voltage connections or 115 volt ac input connections when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through the body.

Warning: Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.

For Artifical Respiration, refer to FM 21-11.

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1 DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2 IF POSSIBLE TURN OFF THE ELECTRICAL POWER

3 IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4 SEND FOR HELP AS SOON AS POSSIBLE

5 AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

Technical Manual

No. 11-6625-3019-12

U.S. Army Communications
and Electronics Materiel
Readiness Command
Fort Monmouth, New Jersey 07703
2 August 1982

TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

TEST AND REPAIR SYSTEM, ELECTRONIC EQUIPMENT AN/MSM-105 (V) 1

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, U.S. Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703.

In either case, a reply will be furnished direct to you.

TABLE OF CONTENTS

			Paragraph	Page
CHAPTER 1.		INTRODUCTION		
Section	I.	General		1-1
		Scope	1-1	1-1
		Indexes of Publications	1-2	1-1
		Maintenance Forms, Records, and Reports	1-3	1-1
		Administration Storage	1-4	1-2
		Destruction of Army Electronics Materiel	1-5	1-2
		Alignment	1-6	1-2
		Reporting Equipment Improvement Recommendations (EIR)	1-7	1-2
Section	II.	Description and Data		1-3
		Purpose and Use	1-8	1-3
		Description	1-9	1-3

TABLE OF CONTENTS (Cont.)

			Paragraph	Page
		Differences Between Models	1-10	1-3
		System Application	1-11	1-3
		Tabulated Data	1-12	1-3
CHAPTER 2.		SERVICE UPON RECEIPT AND INSTALLATION		
Section	I.	Site and Shelter Requirements		2-1
		Site	2-1	2-1
		Equipment Emplacement	2-2	2-2
Section	II.	Service Upon Receipt of Material		2-3
		Unpacking	2-3	2-3
		Checking Equipment	2-4	2-3
Section	III.	Installation Instructions		2-5
		Preliminary Procedures	2-5	2-5
		Assembly of Equipment	2-6	2-5
Section	IV.	Preliminary Adjustment and Alignment.....		2-9
		Preliminary Adjustment	2-7	2-9
		Circuit Adjustment	2-8	2-9
CHAPTER 3.		OPERATING INSTRUCTIONS		
Section	I.	Controls and Indicators		3-1
		Damage from Improper Settings	3-1	3-1
		Operator's Controls	3-2	3-1
Section	II.	Operation		3-3
		Operating Procedures	3-3	3-3
Section	III.	Preparation for Movement		3-5
		Preparation for Movement Procedures	3-4	3-5
		Electric Power Plant Shut-Down Procedures	3-5	3-5
CHAPTER 4.		OPERATOR/CREW AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS		
Section	I.	Introduction		4-1
		Scope	4-1	4-1
		General	4-2	4-1
Section	II.	Tools, Test Equipment and Lubrication		4-3
		Tools and Test Equipment	4-3	4-3
		Lubrication Instructions	4-4	4-3
Section	III.	Repainting and Refinishing Instructions		4-5
		Repainting and Refinishing	4-5	4-5

TABLE OF CONTENTS (Cont.)

			Paragraph	Page
Section	IV.	Preventive Maintenance Checks and Services ...		4-7
		General	4-6	4-7
		Operator/Crew and Organizational Maintenance Checks and Services	4-7	4-8
Section	V.	Troubleshooting		4-9
		Troubleshooting	4-8	4-13
Section	VI.	Organizational Maintenance		4-15
		Maintenance of the OQ-290(V)1/MSM Electronic Equipment Test Facility	4-9	4-15
		Maintenance of the OA-8991/USM-410(V) Electronic Equipment Repair Facility	4-10	4-15
		Maintenance of the AN/MJQ-12A Electric Power Plant	4-11	4-15
CHAPTER 5.		FUNCTIONING OF EQUIPMENT		
Section	I.	Electrical Functions		5-1
		General	5-1	5-1
		Electrical Functions	5-2	5-1
CHAPTER 6.		MATERIEL USED IN CONJUNCTION WITH MAJOR ITEM		6-1
APPENDIX	A.	REFERENCES		A-1
APPENDIX	B.	MAINTENANCE ALLOCATION CHART		B-1
Section	I.	Introduction		B-1
		General	B-1	B-1
		Maintenance Functions	B-2	B-1
		Explanation of Columns in the MAC, Section II	B-3	B-2
		Explanation of Columns in Tool and Test Equipment Requirements, Section III	B-4	B-3
		Explanation of Columns in Remarks, Section IV	B-5	B-3
Section	II.	Maintenance Allocation Chart for Test and Repair System, Electronic Equipment AN/MSM-105(V)1		B-4
Section	III.	Tool and Test Equipment Requirements for Test and Repair System, Electronic Equipment AN/MSM-105(V)1		B-4
Section	IV.	Remarks		B-4

TABLE OF CONTENTS (Cont.)

			Paragraph	Page
APPENDIX	C.	COMPONENTS OF END ITEM LIST		C-1
Section	I.	Introduction		C-1
		Scope	C-1	C-1
		General	C-2	C-1
		Explanation of Columns	C-3	C-1
Section	II.	Integral Components of the End Item		C-3
Section	III.	Basic Issue Items		C-4
APPENDIX	D.	ADDITIONAL AUTHORIZATION LIST		D-1
Section	I.	Introduction		D-1
		Scope	D-1	D-1
		General	D-2	D-1
		Explanation of Listing	D-3	D-1
Section	II.	Additional Authorization List		D-2
APPENDIX	E.	EXPENDABLE SUPPLIES AND MATERIALS LIST		E-1
Section	I.	Introduction		E-1
		Scope	E-1	E-1
		Explanation of Columns	E-2	E-1
Section	II.	Expendable Supplies and Materials List		E-2

LIST OF ILLUSTRATIONS

Figure		Page
1-0	AN/MSM-105(V)1 Electronic Equipment Test and Repair System	1-0
1-1	OO-290(V)1/MSM Electronic Equipment Test Facility	1-5
1-2	OA-8991/MSM Electronic Equipment Repair Facility	1-5
2-1	Power Cable to Switch Box (AN/MJQ-12A) Connections	2-5
2-2	Passageway Assembly and Installation	2-6
C-1	Integral Components of End Item	C-3
C-2	Basic Issue Items	C-4
FO-1	AN/MSM-105(V)1 Electronic Equipment Test and Repair System Emplacement	
FO-2	AN/MSM-105(V)1 Electronic Equipment Test and Repair System Block Diagram	

LIST OF TABLES

Table		Page
1-1	List of Equipment	1-4
1-2	Technical Manual List	1-6
4-1	Operator/Crew and Organizational Preventive Maintenance Checks and Services	4-9
6-1	Auxiliary Equipment	6-1

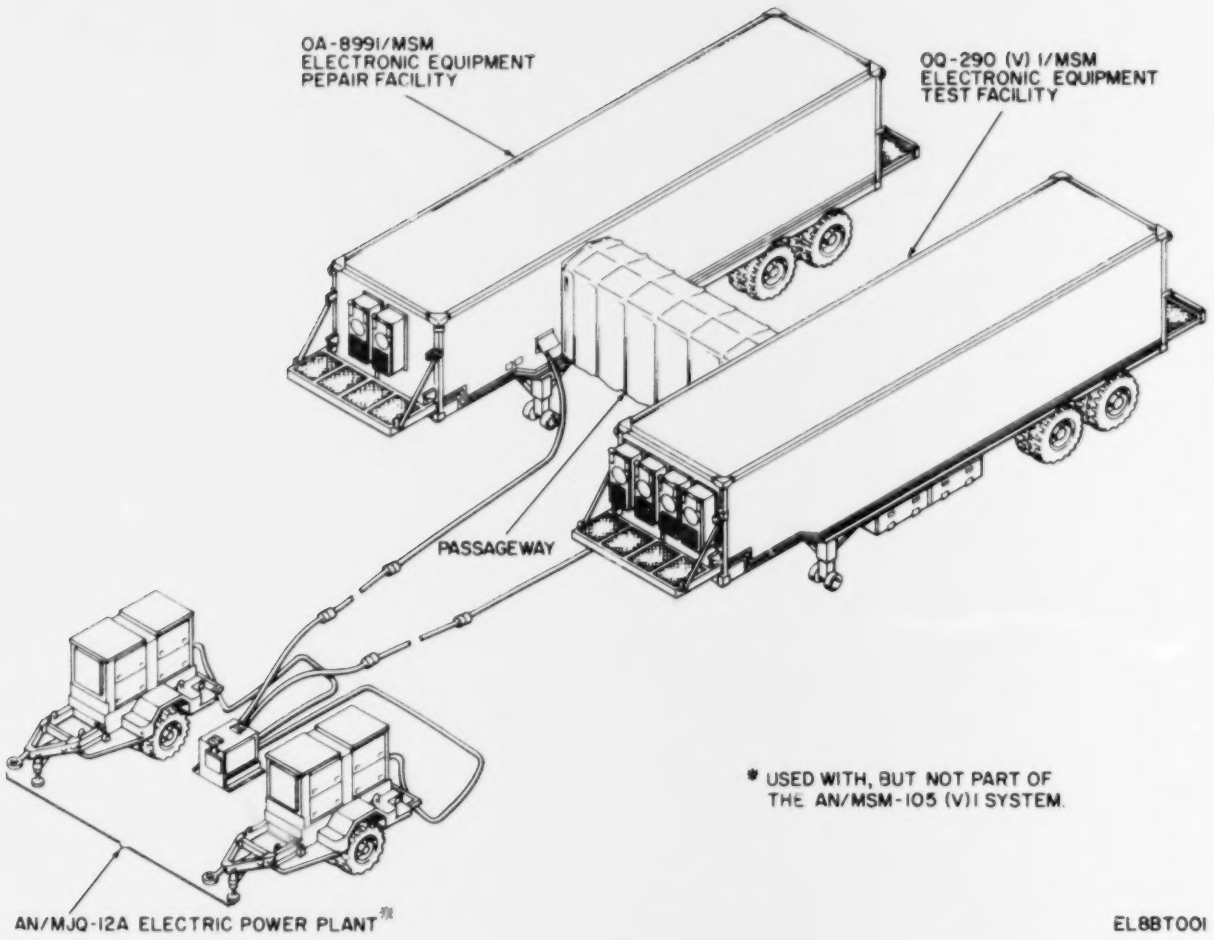


Figure 1-0. AN/MSM-105(V)1 Electronic Equipment Test and Repair System

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope.

This manual provides operator and organizational maintenance instructions for the AN/MSM-105(V)1 electronic equipment test and repair system as shown in figure 1-0. The test and repair system consists of an AN/USM-410(V)2 test station mounted in a van, a van-mounted electronic repair facility and interconnecting passageway. The system uses an AN/MJQ-12A electric power plant (not part of the system). This manual contains instructions for installing, operating and maintaining the test and repair system. It also lists tools, materials and test equipment for operator and organizational maintenance.

1-2. Indexes of Publications.

a. DA Pam 310-1. Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWOs) pertaining to the equipment.

1-3. Maintenance Forms, Records, and Reports.

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those described by TM 38-750, The Army Maintenance Management System.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as described in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DLAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/ NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

1-4. Administrative Storage.

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

1-5. Destruction of Army Electronics Materiel.

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-6. Alignment.

Reference TB 11-6625-2773-35 for the test facility AN/USM-410(V)/2 (test station) and other test and repair facility equipment publications, as applicable, for alignment procedures.

1-7. Reporting Equipment Improvement Recommendations (EIR).

EIR can and must be submitted by anyone who is aware of an unsatisfactory condition with equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure; just simply tell why the design is unfavorable or why a procedure is difficult. EIR may be submitted on SF 368 (Quality Deficiency Report). Mail direct to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL ME-MQ, Fort Monmouth, NJ 07703. A reply will be furnished to you.

Section II. DESCRIPTION AND DATA

1-8. Purpose and Use.

The AN/MSM-105(V)1 electronic equipment test and repair system provides facilities for computer-controlled automatic testing and troubleshooting as well as repair of selected malfunctioning electronic assemblies and subassemblies. Figure 1-0 shows a typical layout of the test and repair system.

1-9. Description.

The test and repair system is a mobile land-based system which is transportable by land, sea or air. It consists of the equipment listed in table 1-1.

1-10. Differences Between Models.

This manual is applicable for AN/MSM-105(V)1 electronic equipment test and repair systems containing AN/USM-410(V)2 test station serial numbers 26, 31 and 33 through 36.

1-11. System Application.

The test and repair system is used to test, troubleshoot and repair a variety of electronic subassemblies.

1-12. Tablulated Data.

Refer to TM 11-6625-2773-12 for performance characteristics of the AN/USM-410(V)2 electronic equipment test station. Refer to the manuals listed in table 1-2 for characteristics of the main component assemblies of the test and repair system.

Table 1-1. List of Equipment

Nomenclature	Common Name	Figure
AN/MSM-105(V)1 Electronic Equipment Test and Repair System	Test and Repair System	1-0
• OQ-290(V)1/MSM Electronic Equipment Test Facility	Test Facility (ETF)	1-1
•• AN/USM-410(V)2 Electronic Equipment Test Station	Test Station	
•• MK-2046/MSM Power Protection Assembly	Power Protection Assembly	
•• XM995 Van	Test Facility Van	
• OA-8991/MSM Electronic Equipment Repair Facility	Repair Facility (ERF)	1-2
•• XM991 Van	Repair Facility Van	
•• Equipment Complement		
•• Passageway	Passageway	1-0
• AN/MJQ-12A Electric Power Plant*	Generator	1-0

*This item is used with, but is not part of, the test and repair system.

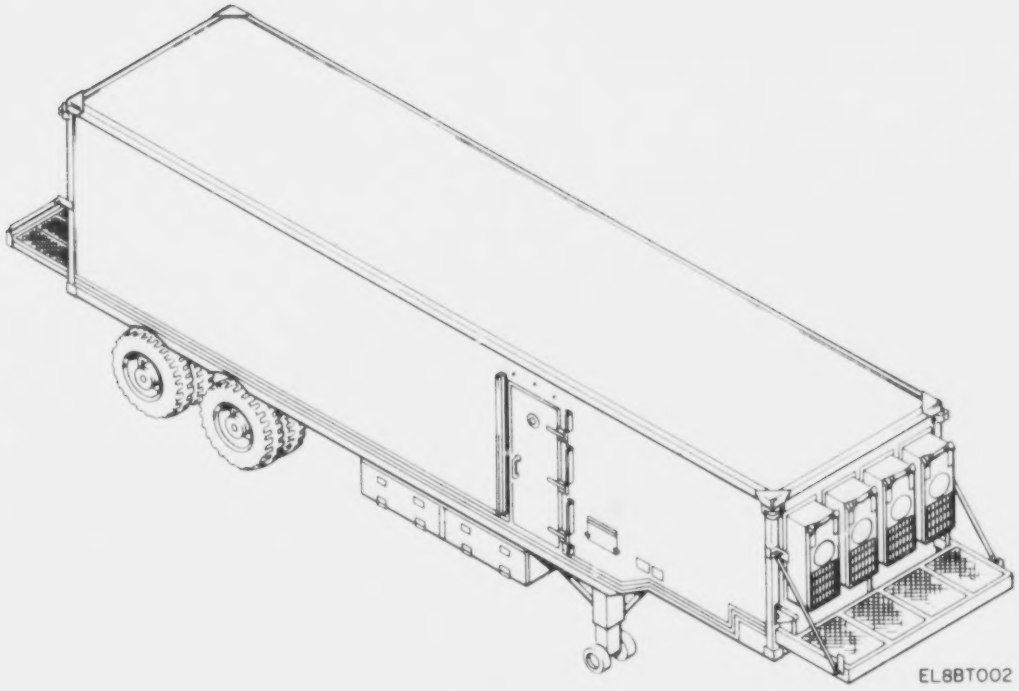


Figure 1-1. OQ-290(V)1/MSM Electronic Equipment Test Facility

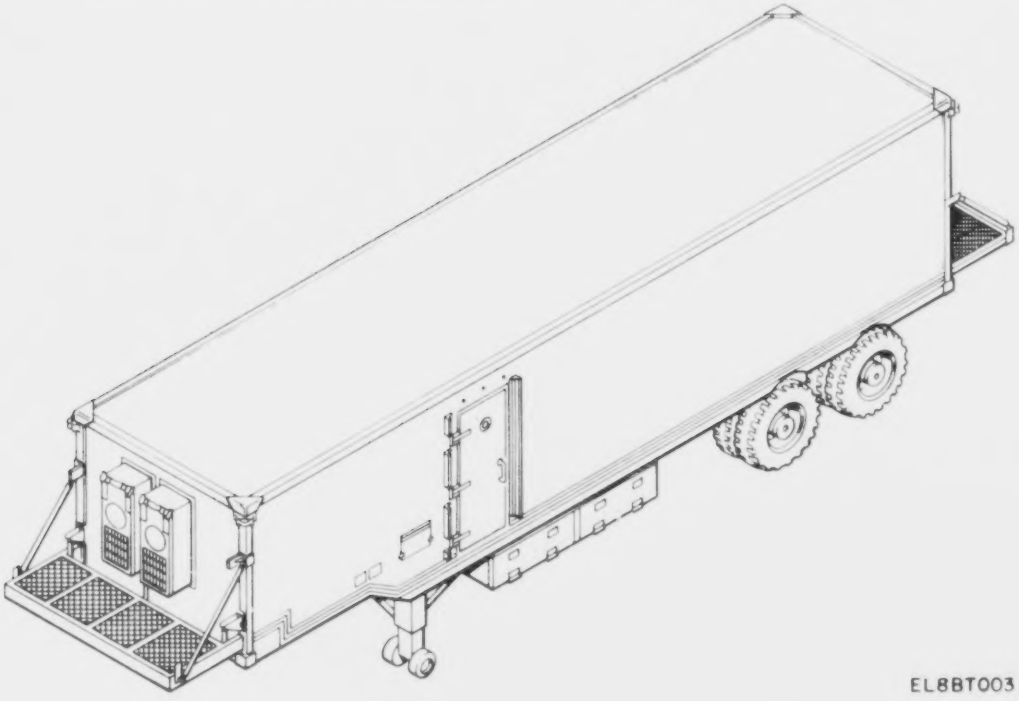


Figure 1-2. OA-8991/MSM Electronic Equipment Repair Facility

Table 1-2. Technical Manual List

Equipment	Title	Number
AN/USM-410(V)2 Electronic Equipment Test Station	Operator and Organizational Maintenance Direct Support Maintenance General Support Maintenance	TM 11-6625-2773-12 TM 11-6625-2773-30-1 TM 11-6625-2773-40
MK-2046/MSM Power Protection Assembly	Operator's, Organizational, Direct Support and General Support Maintenance	N/A
OQ-290(V)1/MSM Electronic Equipment Test Facility	Operator's, Organizational, Direct Support and General Support Maintenance	TM 11-5410-216-14
OA-8991/MSM Electronic Equipment Repair Facility	Operator's, Organizational, Direct Support and General Support Maintenance	TM 11-5410-217-14
*AN/MJQ-12A Electric Power Plant	Operator and Organizational Maintenance	TM 5-6115-545-12

*Used with, but not part of AN/MSM-105(V)1 Electronic Equipment Test and Repair System.

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

Section I. SITE AND SHELTER REQUIREMENTS

2-1. Site.

The following factors must be considered when selecting a site:

a. Geography

(1) Map coordinates
(2) Dimensions
(3) Separation from interfering objects
(4) Type of terrain and topography
(5) Site topographical map showing planned location
(6) Direction of prevailing wind
(7) Special local conditions
(8) Climatology

b. Logistics

(1) Utilities

(a) Existing primary 120/208 vac, three-phase 60-Hz power and its reliability, phase frequency and expected voltage and frequency stability.

(b) Location of existing power lines and transformer banks or vaults.

(c) Location of existing telephone or communications facilities.

(2) Location of existing hardstands

(3) Available all-weather roads

(4) Fuel facility, type and classification, method of storage at the site, transportation to site, storage capacity and distribution methods.

2-2. Equipment Emplacement.

The on-site, equipment emplacement pattern shown in figure FO-1 should be adhered to as closely as possible.

a. Select a rectangular plot that is 30 by 175 feet with no more than a 6 percent slope. The terrain must be firm enough to support the weight of the tractor with attached semitrailer for movement during emplacement.

b. Move the vans into positions as shown in figure FO-1.

NOTE

Repeat steps c. through i. for each semitrailer.

c. Remove wheel chocks from storage brackets underneath van to rear of rear axle.

d. Place one chock behind outside wheel of front axle and the other chock in front of inside wheel of front axle.

e. Remove landing gear shoes from stowage brackets underneath van body.

f. Position landing gear shoes under landing gear legs and turn crank clockwise to lower legs until they support front of van body.

g. Disconnect air brake hoses from towing vehicle.

h. Disconnect intervehicular electrical cable.

i. Release kingpin lock on the fifth wheel and drive towing vehicle away from semitrailer.

j. Remove passageway from compartment under repair facility van and position in approximate location shown in figure FO-1. The passageway, with the exception of the platform assembly, is contained in five (5) bags.

k. Move the AN/MJQ-12A electric power plant generators (if used) into position as shown in figure FO-1. The electric power plant must be placed no closer than 100 feet to the test and repair facilities. Placing these units closer to the facilities will produce an undesirable noise condition.

NOTE

System may be powered from a commercial source of sufficient capacity to handle the two vans.

Section II. SERVICE UPON RECEIPT OF MATERIAL

2-3. Unpacking.

Remove all packing material from the equipment and stow in storage box under associated facility van.

2-4. Checking Equipment.

a. Inspect the unpacked equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (Paragraph 1-3b).

b. Check the equipment against the component listing in the operator's manuals (TM 11-6625-2773-12, TM 11-5410-216-14, TM 11-5410-217-14 and TM 11-6130-415-14) and the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of TM 38-750. The equipment should be placed in service even though a minor assembly or part that does not affect proper functioning is missing.

c. Check to see whether the equipment has been modified. Equipment which has been modified will have the MWO number on the front panel, near the nomenclature plate. Check also to see whether all currently applicable MWOs have been applied. Current MWOs applicable to the equipment are listed in DA Pam 310-7.

Section III. INSTALLATION INSTRUCTIONS

2-5. Preliminary Procedures.

Perform primary power connections procedures for the electronic equipment repair facility as described in TM 11-5410-217-14, but do not turn on power. Refer to figure 2-1 for power cable to switch box connections when using the AN/MJQ-12A electric power plant.

2-6. Assembly of Equipment.

a. Perform service upon receipt procedures for the OQ-290(V)1/MSM electronic equipment test facility as described in TM 11-5410-216-14 and as shown in figure FO-1. Refer to figure 2-1 for power cable to switch box connections when using the AN/MJQ-12A electric power plant.

b. Perform service upon receipt procedures for the OA-8991/MSM electronic equipment repair facility as described in TM 11-5410-217-14 and as shown in figure FO-1.

c. Assemble and install passageway as shown in figure 2-2.

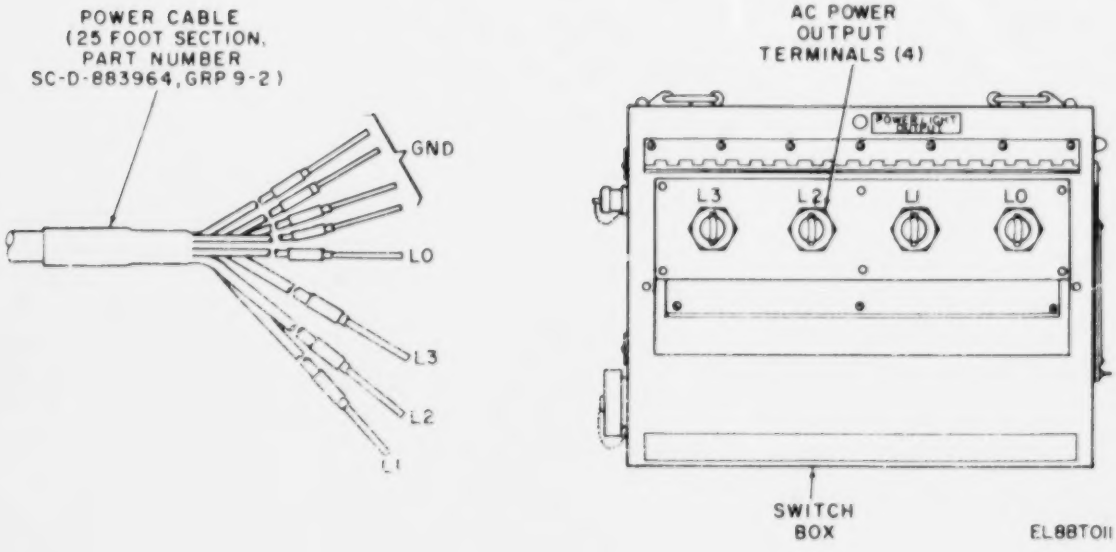
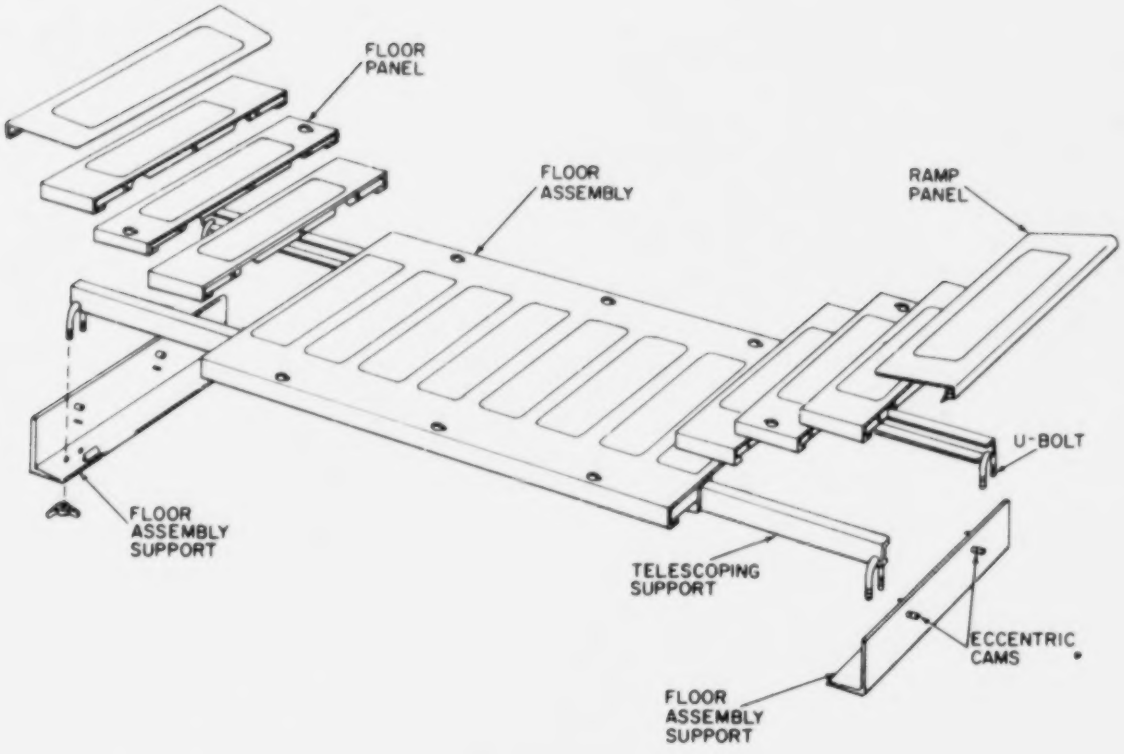


Figure 2-1. Power Cable to Switch Box (AN/MJQ-12A) Connections



A. FLOOR ASSEMBLY

EL8BT007

Figure 2-2. Passageway Assembly and Installation (Sheet 1 of 3)

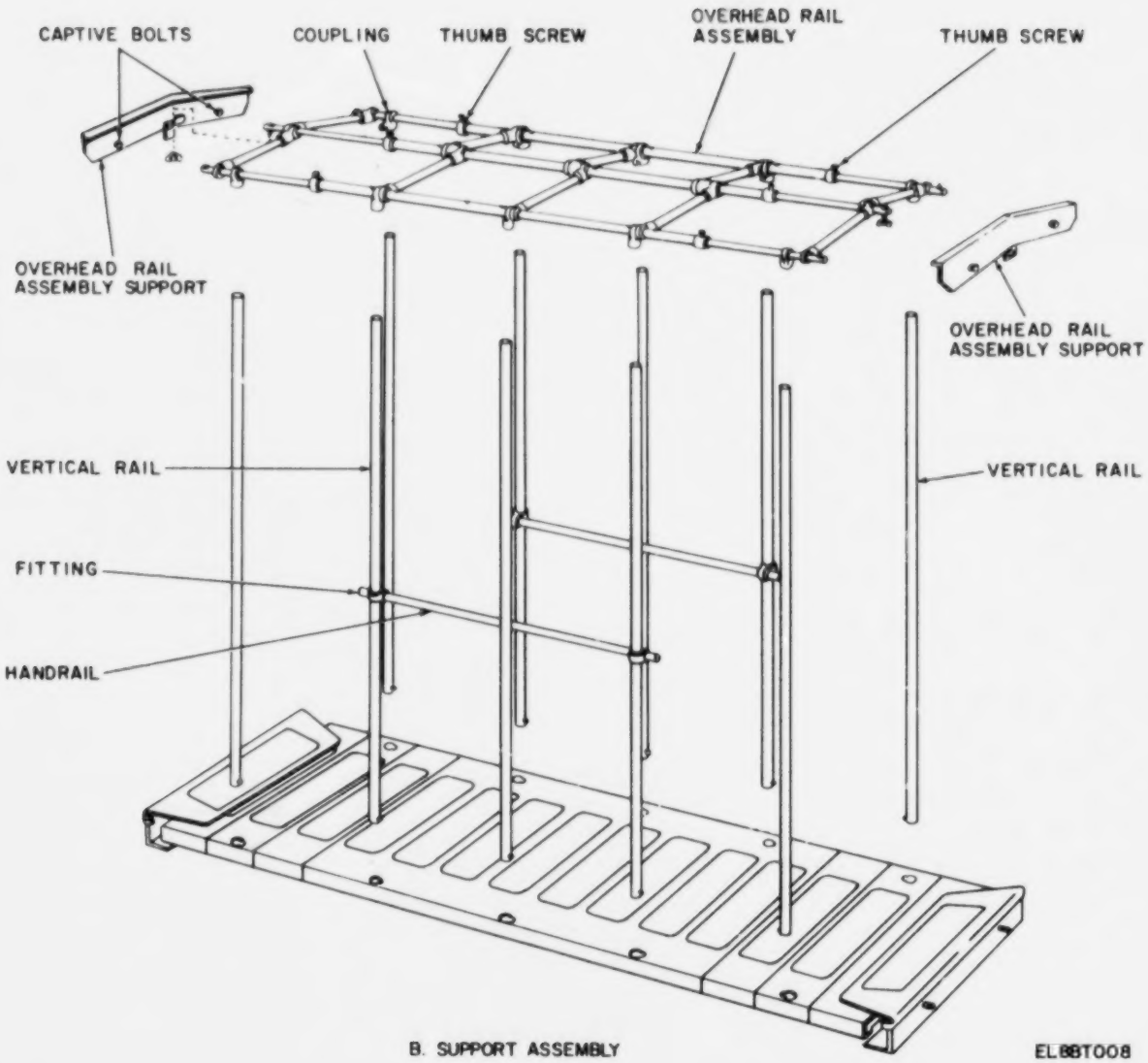


Figure 2-2. Passageway Assembly and Installation (Sheet 2 of 3)

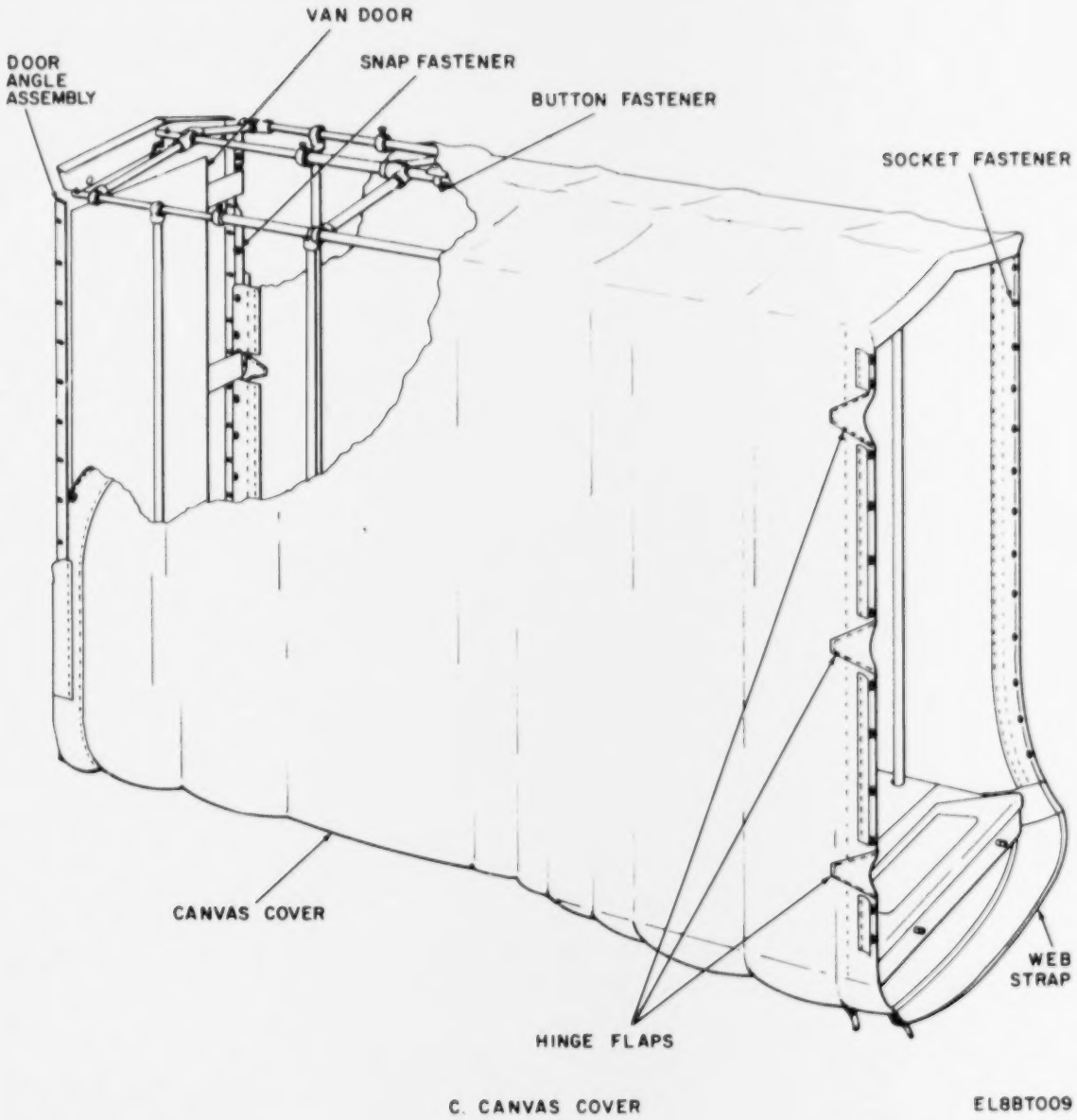


Figure 2-2. Passageway Assembly and Installation (Sheet 3 of 3)

Section IV. PRELIMINARY ADJUSTMENT AND ALIGNMENT

2-7. Preliminary Adjustment.

Perform test facility preliminary adjustments as contained in TM 11-6625-2773-12.

2-8. Circuit Alignment.

Perform test facility alignment procedures as contained in TB 11-6625-2773-35.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INDICATORS

3-1. Damage from Improper Settings.

CAUTION

Certain combinations of control settings will result in damage to the equipment. Make sure that these combinations are not selected at any time during operation by being careful to adhere to the given sequence of operating procedures.

3-2. Operator's Controls.

Refer to technical manuals as listed in table 1-2 for a description of each operator control of the AN/MSM-105(V)1 electronic equipment test and repair system.

Section II. OPERATION

3-3. Operating Procedures.

Refer to technical manuals listed in table 1-2 for operating procedures.

Section III. PREPARATION FOR MOVEMENT

3-4. Preparation for Movement Procedures.

a. Prepare the two vans for movement as described in TM 11-5410-216-14 and TM 11-5410-217-14.

b. Disassemble passageway, place items in appropriate bag, and stow bags and platform assembly in storage compartment under repair facility van. (Refer to figure 2-2.)

The passageway, with the exception of the platform assembly, is stowed in five (5) bags. The storage contents of each bag is as follows:

(1) Bag 1 of 5: Passageway canvas cover

(2) Bag 2 of 5: Floor panel assemblies

(3) Bag 3 of 5: Rail overhead assembly

(4) Bag 4 of 5: Ramp panel assembly
Bracket assembly
Support angle assembly

(5) Bag 5 of 5: Rail, Vertical assembly
Rail, Vertical
Handrail

CAUTION

Close storage box doors on underside of the two vans before lowering van onto tractor.

CAUTION

There must be sufficient clearance between tractor and platform for very sharp turns when using the modified M915 tractor.

c. Use M818, or M915 with 5th wheel modification, (5 ton) tractors to move vans. Couple the vans to the tractors as described in TM 9-2330-393-14.

3-5. Electric Power Plant Shut-Down Procedures.

Shut down the AN/MJQ-12A electric power plant generators, and prepare system for movement. Refer to TM 5-6115-545-2.

CHAPTER 4

OPERATOR/CREW AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. INTRODUCTION

4-1. Scope.

This chapter contains instructions for the operator/crew and organizational maintenance of the AN/MSM-105(V)1 electronic equipment test and repair system (test and repair system). It includes additional tools and equipment required for testing, evaluation, maintenance and lubrication, checkout, preventive maintenance, troubleshooting, replacement and assembly maintenance procedures. Fault isolation, troubleshooting and repair beyond the scope of this section should be directed to appropriate DS/GS maintenance personnel.

4-2. General.

a. Tools and test equipment are listed that are required for organizational maintenance of the test and repair system.

b. Lubrication instructions specify the equipment, frequency and type of lubrication and lubrication points

c. Repainting and refinishing instructions provide paints and finishes required for touch-up of various surfaces used on the facilities.

d. Preventive maintenance procedures are based on daily, weekly, monthly, quarterly and semiannual time intervals. The intervals are adjusted for abnormal operations or severe conditions. The procedures, performed as directed, insure optimum performance.

e. Troubleshooting procedures provide a method of manual fault isolation.

Section II. TOOLS, TEST EQUIPMENT AND LUBRICATION

4-3. Tools and Test Equipment.

Repair parts, tools, test equipment, and accessories issued with, or prescribed for use by the operator, for the AN/MSM-105(V)1 electronic equipment test and repair system are listed in the applicable technical manuals as listed in table 1-2.

4-4. Lubrication Instructions.

Refer to applicable technical manuals as listed in table 1-2 for lubrication instructions.

Section III. REPAINTING AND REFINISHING INSTRUCTIONS

4-5. Repainting and Refinishing.

Repainting and refinishing instructions for touching-up damaged areas to prevent rust and corrosion for surfaces of the test and repair system are contained in the applicable technical manuals as listed in table 1-2.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-6. General.

a. Operator/Crew preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to maintain the equipment in serviceable condition. To be sure that your test and repair system is always ready for your mission, you must do scheduled PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

(1) Perform your D PMCS daily to be sure that your equipment is ready to go.

(2) WEEKLY AND MONTHLY PMCS are important checks you make to keep serious problems from suddenly happening. Perform WEEKLY as well as DAILY PMCS if:

(a) You are the assigned operator and have not operated the item since the last WEEKLY.

(b) You are operating the item for the first time.

(3) When an item of equipment is reinstalled after removal for any reason, perform the necessary D PMCS to be usre the item meets the operational criteria.

b. Organization preventive maintenance procedures are designed to help maintain equipment in serviceable condition. They include what items should be checked and how to check them. These checks and services are inspections that are to be made at specific (W) weekly, (M) monthly, (Q) quarterly, (S) semiannually and (A) annual intervals.

c. Routine checks like CLEANING, DUSTING, WASHING, CHECKING FOR FRAYED CABLES, STOWING ITEMS NOT IN USE, COVERING UNUSED RECEPTACLES AND CHECKING FOR LOOSE NUTS AND BOLTS are not listed as PMCS checks. They are things that you should do anytime you see they must be done. If you find a routine check like one of those listed in your PMCS, it was listed because other operators reported problems with this item.

WHEN YOU ARE DOING ANY PMCS OR ROUTINE CHECKS, KEEP IN MIND THE WARNINGS AND CAUTIONS.

WARNING

Compressed air is dangerous and can cause serious bodily harm if protective means or methods are not observed to prevent a chip or particle (of whatever size) from being blown into the eyes or unbroken skin of the operator or other personnel. Compressed air shall not be used for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personnel protective equipment. Do not use compressed air to dry parts when TRICHLOROTRIFLUOROETHANE has been used.

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent sould not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves naturals oils, prolonged contact with skin should be avoided. when necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

NOTE

The PROCEDURES column in your PMCS charts instructs you how to perform the required checks and services. Carefully follow these instructions, and if tools are needed or whatever the chart instructions tell you, get organizational maintenance to do the necessary work. If your equipment must be in operation all the time check those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the eqipment can be shut down.

d. Deficiencies that cannot be corrected must be reported to higher category maintenance personnel. Records and reports of preventive maintenance must be made in accordance with procedures given in TM 38-750.

4-7. Operator/Crew and Organizational Preventive Maintenance Checks and Services.

a. The necessary PMCS to be performed one ach of the components of the test and repair system are listed and described in the manuals listed in table 1-2.

b. The operator/crew and organizational preventive maintenance checks and services are listed in table 4-1.

Table 4-1. Operator/Crew and Organizational Preventive Maintenance Checks and Services

D-Daily
Time Required:

W-Weekly
Time Required:

M-Monthly
Time Required:

Q-Quarterly
Time Required:

SA-Semi Annual
Time Required:

Interval					Item to be Inspected Procedure	Work Time (T/H)
D	W	M	Q	SA		
	•				TEST FACILITY a. Check that ground is firm with no noticeable depression (sinking) or erosion (wash-out) under front landing gears and rear leveling jacks. b. Check that all tires are properly inflated and wheel chocks are in place against rear wheels. c. Check that the van is level at each of the eight level assemblies (two on each corner). d. Check that the input power cable to the power entrance box (A1A1) is securely connected to A1A1J1 and cable is not damaged or pulled from connectors. Check all connecting cable sections to electric power plant. e. Check that the ground cable is securely connected to the ground rod and that the ground rod is in place. f. Check that there is no water leakage around all doors and into storage box under van.	
	•				REPAIR FACILITY a. Check that the ground is firm with no noticeable depressing (sinking) or erosion (wash-out) under front landing gears and rear leveling jacks.	

Table 4-1. Operator/Crew and Organizational Preventive Maintenance Checks and Services - Continued

D-Daily
Time Required:

W-Weekly
Time Required:

M-Monthly
Time Required:

Q-Quarterly
Time Required:

SA-Semi Annual
Time Required:

Interval					Item to be Inspected Procedure	Work Time (T/H)
D	W	M	Q	SA		
					REPAIR FACILITY (Cont.)	
					b. Check that all tires are properly inflated and wheel chocks are in place against rear wheels.	
					c. Check that the van is level at each of the light level assemblies (two on each corner).	
					d. Check that the input power cable to the power entrance box (A1A1) is securely connected to A1A1J1 and cable is not damaged or pulled from connectors. Check all connecting cable sections to electric power plant.	
					e. Check that the ground cable is securely connected to the ground rod, and that the ground rod is in place.	
					f. Check that there is no water leakage around all doors and into storage box under van.	
	•				PASSAGEWAY	
					a. Check that the passageway is securely connected to each van.	
					b. Check that the cover is securely attached, and that there are no tears, rips or holes.	

Table 4-1. Operator/Crew and Organizational Preventive Maintenance Checks and Services - Continued

D-Daily
Time Required:

W-Weekly
Time Required:

M-Monthly
Time Required:

Q-Quarterly
Time Required:

SA-Semi Annual
Time Required:

Interval					Item to be Inspected Procedure	Work Time (T/H)
D	W	M	Q	SA		
					PASSAGEWAY (Cont.) c. Check that the platform does not have any breaks or splits, and is not damaged in any other way. WARNING High voltage is present if power is not removed from the switch box.	
	•				ELECTRIC POWER PLANT a. Check that the output power cable from the switch box is securely connected to the switch box terminals. b. Check that all other cables from the generators to the switch box are securely connected to the switch box and are not damaged or pulled from connectors. c. Check that the ground cable is securely connected to the ground rod and that the ground rod is in place.	

Section V. TROUBLESHOOTING

4-8. Troubleshooting.

Refer to applicable technical manuals as listed in table 1-2 for troubleshooting the assemblies of the test and repair system. Any malfunction that is beyond the scope prescribed for the operator by the maintenance allocation chart shall be referred to organizational maintenance.

Section VI. ORGANIZATIONAL MAINTENANCE

4-9. Maintenance of the OQ-290(V)1/MSM Electronic Equipment Test Facility.

Refer to TM 11-5410-216-14 for operator and organizational maintenance procedures.

4-10. Maintenance of the OA-8991/USM-410(V) Electronic Equipment Repair Facility.

Refer to TM 11-5410-217-14 for operator and organizational maintenance procedures.

4-11. Maintenance of tne AN/MJQ-12A Electric Power Plant.

Refer to TM 5-6115-545-12 for operator and organizational maintenance procedures for the generator set and TM 9-2330-205-14 for the M200A1 trailer.

CHAPTER 5

FUNCTIONING OF EQUIPMENT

Section I. ELECTRICAL FUNCTIONS

5-1. General.

This chapter provides a functional description of the electrical system of the AN/MSM-105(V), electronic equipment test and repair system. The test facility has a primary function of automatic test and troubleshooting of electronic assemblies and subassemblies. The repair facility contains equipment for the repair and inspection of the electronic assemblies and subassemblies. The electrical system of each facility provides filtering, control, and distribution of input power. A block diagram of the test and repair system is shown in figure FO-2.

5-2. Electrical Functions. (figure FO-2)

Main ac power from the AN/MJQ-12A electric power plant enters each van at the power entrance box A1A1 and it is applied to power distribution box A1A5 through filters A1A2 (filter box), main circuit breaker A1A3CB1, and voltage/current monitor meter box A1A4. The power distribution box provides control and overload protection for the air conditioners, lighting, convenience outlets and associated test and repair equipment.

Refer to TM 9-2330-363-14 for a description of the basic XM-991/XM-995 van electrical system.

CHAPTER 6

MATERIEL USED IN CONJUNCTION WITH MAJOR ITEM

6-1. Refer to table 6-1 for a list of auxiliary equipment used with the AN/USM-105(V)1 electronic equipment test and repair system.

Table 6-1. Auxiliary Equipment

Item	Description
AN/MJQ-12A Electric Power Plant	Provides primary power input for the test and repair system.

APPENDIX A

REFERENCES

AR 55-38	Discrepancy in Shipment Report.
AR 700-58	Packaging Improvement Report.
DA Form 2028	Recommended Changes to Publications and Blank Forms.
DA Pam 310-1	Index of Technical Publications: Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8 and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	Military Publications: US Army Equipment Index of Modification Work Orders.
TB 11-6625-2773-35	Alignment Procedures, Test Station, Electronic Equipment AN/USM-410(V)2 6625-01-069-4223.
TM 5-6115-545-12	Operator and Organizational Maintenance Manual, Generator Set, Diesel Engine Driven, Tactical. Skid Mounted, 60 kW, 3-Phase, 4-Wire, 120/208 and 240/416 Volt.
LO 5-6115-545-12	Lubrication Order, Generator Set, Diesel Engine Driven, Tactical. Skid Mounted, 60 kW, 3-Phase, 4-Wire, 120/208 and 240/416 Volt.
TM 9-2330-205-14	Operator, Organizational, Direct Support and General Support Maintenance Manual, Including RPSTL. Chassis, Trailer: Generator, 2 1/2 Ton, 2-Wheel, M200A1.
TM 9-2330-363-14	Operator's, Organizational, Direct Support and General Support Maintenance Manual Semitrailer, Van: Electronic 10-Ton, 4-Wheel XM991, XM995.
TM 11-6625-2773-12	Operator and Organizational Maintenance Manual Test Station, Electronic Equipment AN/USM-410(V)2, 6625-01-069-4223.

TM 11-6625-2773-30-1	Direct Support Maintenance Manual Test Station, Electronic Equipment AN/USM-410(V)2, 6625-01-069-4223.
TM 11-6625-2773-40	General Support Maintenance Manual Test Station, Electronic Equipment AN/USM-410(V)2, 6625-01-069-4223.
TM 11-6625-3019-20P	Organizational Maintenance Repair Parts and Special Tools List for Test and Repair System, Electronic Equipment AN/MSM-105(V)1.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 38-750-1	The Army Maintenance Management System (TAMMS), Field Command Procedures.
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Material to Prevent Enemy Use (Electronics Command).

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. Maintenance functions.

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, hydraulic fluids, compressed air supplies or gases.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services[1] or other maintenance actions[2] to restore serviceability to an item by correcting specific damage, fault, malfunction or failure in a part, subassembly, module (component or assembly), end item or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

B-3. Explanation of Columns in the MAC, Section II.

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2).

---

[1]Services - inspect, test, service, adjust, align, calibrate or replace.
[2]Actions - welding, grinding, riveting, straightening, facing, remachining, or resurfacing.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various categories are as follows:

C ..... Operator or crew.
O ..... Organizational maintenance.
F ..... Direct support maintenance.
H ..... General support maintenance.
D ..... Depot maintenance.

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function. The code in this column is keyed to the tools and test equipment requirements list in Section III.

f. Colmn 6, Remarks. Column 6 contains, when applicable, a code which is keyed to the remarks contained in Section IV.

B-4. Explanation of Columns in Tool and Test Equipment Requirements, Section III

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Category. The lowest category maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. Explanation of Columns in Remarks, Section IV.

a. Column 1, Reference Code. The code listed in Column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART
FOR
TEST AND REPAIR SYSTEM, ELECTRONIC EQUIPMENT
AN/MSM-105(V)1

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND TEST EQUIPMENT	(6) REMARKS
00	TEST & REPAIR SYSTEM AN/MSM-105(V)1	INSPECT		0.6					
01	PASSAGEWAY ASSY	INSPECT		0.1					01
		REPLACE		4.0					
		REPAID			1.0			01	01
02	TEST FACILITY OQ-290(V)1/MSM	INSPECT		0.2					01
		REPAIR		10.0					01
		REPAIR			10.0				01
		REPAIR				10.0			01
		TEST		2.0					01
		OVERHAUL					24.0		
03	REPAIR FACILITY OA-8991/MSM	INSPECT		0.2					.02
		REPAIR		10.0					02
		REPAIR			10.0				02
		REPAIR				10.0			02
		OVERHAUL					24.0		
04	POWER UNIT AN/MJQ-12A	INSPECT		0.1					03, 04

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
TEST AND REPAIR SYSTEM, ELECTRONIC EQUIPMENT
AN/MSM-105(V)1

TOOL OR TEST EQUIPMENT REFERENCE CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
01	F	TOOL KIT, TK-105/G	5180-00-610-8177	

Section IV. REMARKS

Reference Code	Remarks
01	SEE TM 11-5410-216-14
02	SEE TM 11-5410-217-14
03	SEE TM 5-4120-201-12
04	USED WITH BUT NOT PART OF THE AN/USM-105(V)1

APPENDIX C

COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

C-1. Scope.

This appendix lists integral components of and basic issue items for the AN/MSM-105(V)1 electronic equipment test and repair system to help you inventory items required for safe and efficient operation.

C-2. General.

This Components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the repair facility and must accompany it whenever it is transferred or turned in. The illustrations will help you to identify these items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the repair facility in operation, to operate it, and to perform emergency repairs. Although shipped separately packed, they must accompany the repair facility during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. Explanation of Columns.

a. Illustration. This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration on which the item is shown.

(2) Item Number. The number used to identify item called out in the illustration.

b. National Stock Number. Indicates the National Stock Number assigned to the item and which will be used for identifying and requisitioning the listed item.

c. Description. This column is divided as follows:

(1) Part Number. Indicates the primary number used by the manufacturer to identify an item or range of items. Controls the design and characteristics of the item by means of its engineering drawings, specifications, standards and inspection requirements. Also indicates the Federal item name and gives a minimum description of the item.

(2) Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code listed in SB 708-42 which is used to identify the manufacturer, distributor, Government agency, etc., as applicable.

d. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

e. Usable On Code. (Not applicable.)

f. Quantity Required (Qty Req'd). This column lists the quantity of each item required for a complete major item.

g. Quantity. This column is left blank for use during an inventory. Under the Rev'd column, list the quantity you actually received on your major item. The date column is for your use when you inventory the major item at a later date, such as for shipment to another site.

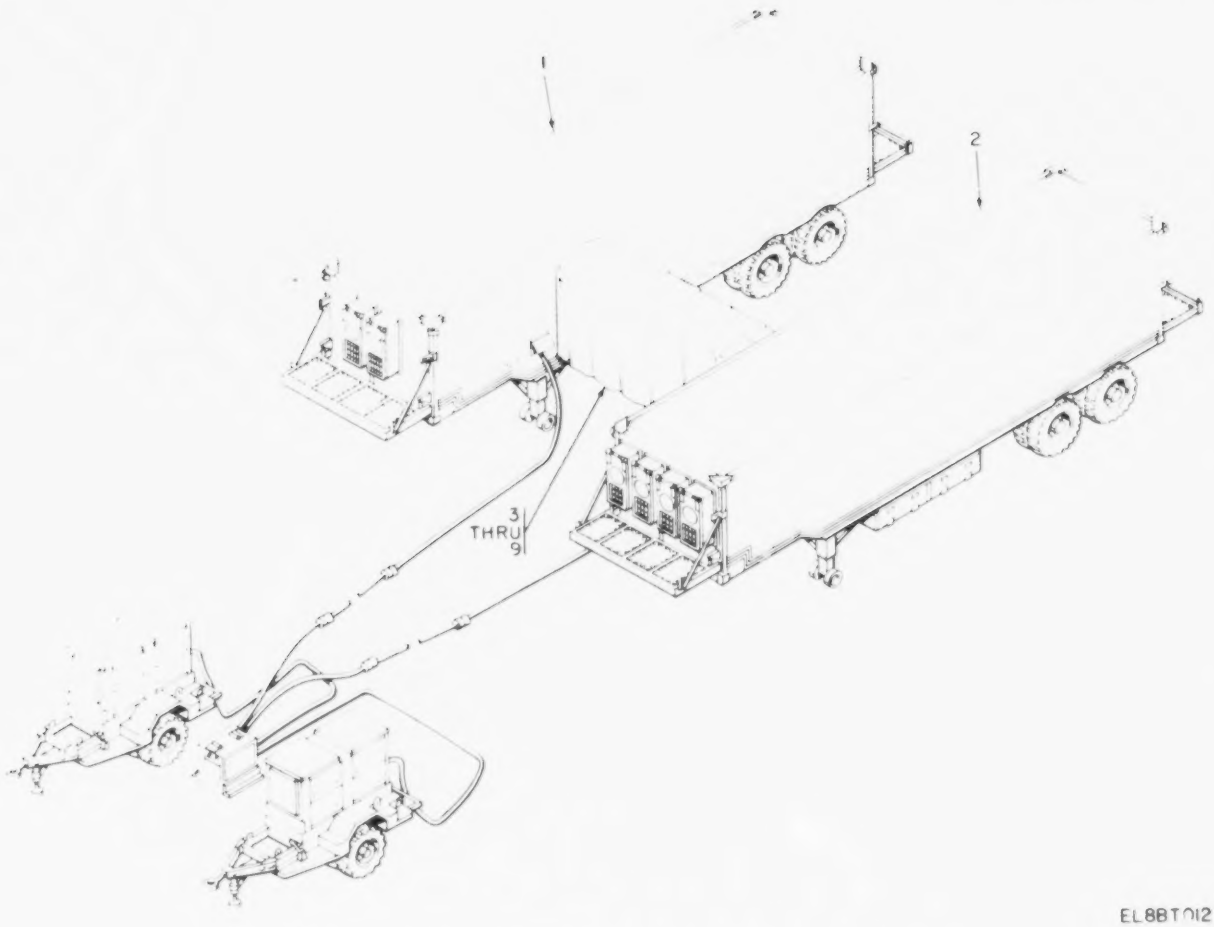


Figure C-1. Integral Components of End Item

Section II. INTEGRAL COMPONENTS OF THE END ITEM

(1) ILLUSTRATION (a) FIGURE NO	(1) ILLUSTRATION (b) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY REV'D	(7) QUANTITY DATE
C-1	1	6625-01-095-9313	Repair Facility, Electronic Equipment OA-8991/MSM (Refer to TM 11-5410-217-14) B4008007			1		
C-1	2	6625-01-095-9312	Test Facility, Electronic Equipment OQ-290(V)1/MSM (Refer to TM 11-5410-216-14) B4008006			1		

Section II. INTEGRAL COMPONENTS OF THE END ITEM - Continued

(1) ILLUSTRATION (a) FIGURE NO	(1) ILLUSTRATION (b) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY REV'D	(7) QUANTITY DATE
C-1	3		Passageway Assembly SC-D-506827	Storage Box Under Repair Facility Van		1		
C-1	4		Installation Kit, Marked Bag 1 of 5 SM-B-377677			1		
C-1	5		Installation Kit, Marked Bag 2 of 5 SM-B-377678			1		
C-1	6		Installation Kit, Marked Bag 3 of 5 SM-B-377679			1		
C-1	7		Installation Kit, Marked Bag 4 of 5 SM-B-377680			1		
C-1	8		Installation Kit, Marked Bag 5 of 5 SM-B-377681			1		
C-1	9		Platform Assembly SM-D-377683			1		

Figure C-2. Basic Issue Items

Section III. BASIC ISSUE ITEMS

(1) ILLUSTRATION (a) FIGURE NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY REV D	(7) QUANTITY DATE
			Technical Manuals					
C-2	1	TM 11-6625-3019-12	Test and Repair System, Electronic Equipment AN/MSM-105(V)1			1		
C-2	2	TM 11-5410-216-14	Test Facility, Electronic Equipment OQ-290(V)1/MSM	Test Facility		1		
C-2	3	TM 11-5410-217-14	Repair Facility, Electronic Equipment OA-8991/MSM	Repair Facility		1		
C-2	4	TM 5-6115-545-12	Generator Set	Power Plant		1		
	5	TM 9-7330-205-14	Trailer, Generator M200A1	Power Plant				

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1. Scope.

This appendix lists additional items which are authorized for the support of the AN/MSM-105(V)1 electronic equipment test and repair system.

D-2. General.

This list identifies items that do not have to accompany the repair facility and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA or JTA.

D-3. Explanation of Listing.

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION PART NUMBER AND FSCM	(3) UNIT OF MEAS	(4) QTY REQD
	Electric Power Plant AN/MJQ-1(A)	EA	1
	Tractor M61A1 or modified M915	EA	

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. Scope.

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/MSM-105(V)1 electronic equipment test and repair system. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts and Heraldic Items).

E-2. Explanation of Columns.

a. Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

c. Column 3 - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column 4 - Description. Indicates the Federal item name, if required, and gives a description of the item. The last line for each item indicates the part number, followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, as applicable.

e. Column 5 - Unit of Measure (Unit of Meas). Indicates the measure used in performing the actual maintenance function. If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO AND FSCM	(5) UNIT OF MEAS
1			Diesel Fuel	GAL

Charts Transposed to

End of Volume.

By Order of the Secretary of the Army:

EDWARD C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

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BE EXACT. PIN POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 20 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		FO3		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. + 24 VDC is the input voltage.

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SSG I. M. DeSpiritof 999-1776	SSG I.M. DeSpiritof

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

$5/9\ (^0F - 32) = {}^0C$
212^0 Fahrenheit is equivalent to 100^0 Celsius
90^0 Fahrenheit is equivalent to 32.2^0 Celsius
32^0 Fahrenheit is equivalent to 0^0 Celsius
$9/5\ C^0 + 32 = F^0$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

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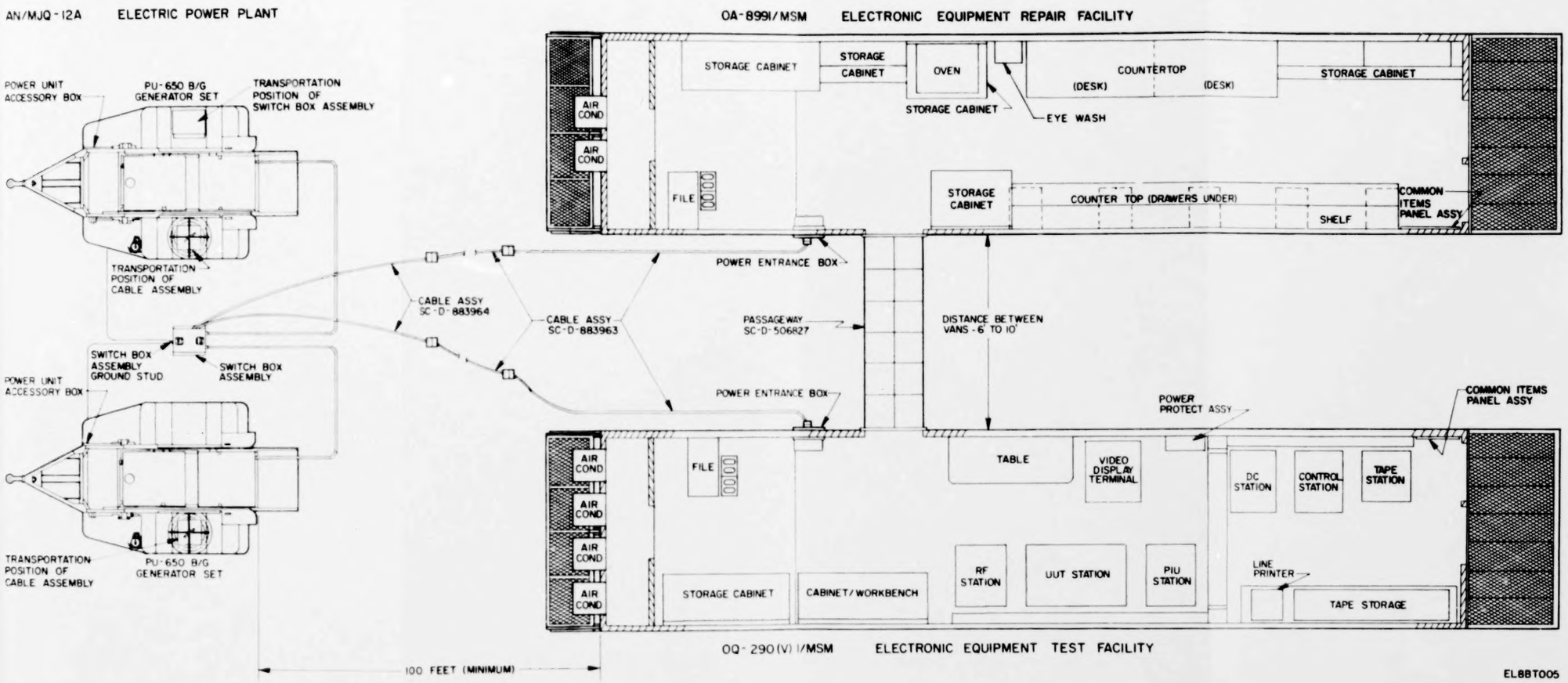

Figure FO-1. AN/MSM-105(V)1 Electronic Equipment Test and Repair System Emplacement

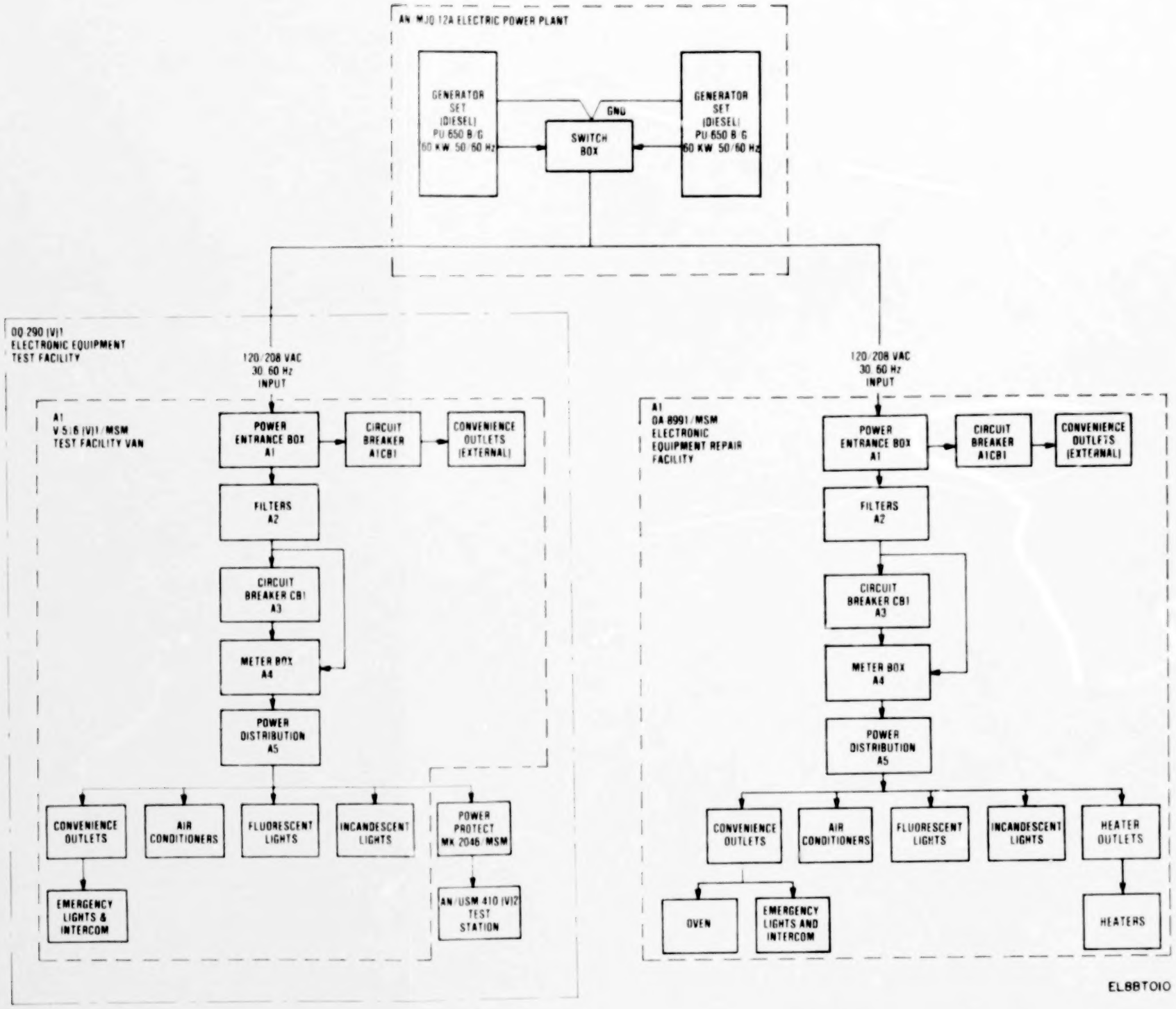

Figure FO-2. AN/MSM-105(V)1 Electronic Equipment Test and Repair System Block Diagram